



A.D. 1857 . . . . . N° 1770.

S P E C I F I C A T I O N

OF

JOSEPH EXLEY AND JOHN OGDEN.

FURNACES.

L O N D O N :

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY :

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,

25, SOUTHAMPTON BUILDINGS, HOLBORN.

Price 7d.

1857.





---

A.D. 1857 . . . . . N° 1770.

---

## Furnaces.

---

**LETTERS PATENT** to Joseph Exley, of Leeds, in the County of York, Engineer, and John Ogden, of the same Place, Engineer, for the Invention of “**IMPROVEMENTS IN FURNACES OR FIRE-PLACES FOR THE PREVENTION OF SMOKE.**”

Sealed the 18th August 1857, and dated the 24th June 1857.

---

**PROVISIONAL SPECIFICATION** left by the said Joseph Exley and John Ogden at the Office of the Commissioners of Patents, with their Petition, on the 24th June 1857.

We, JOSEPH EXLEY, of Leeds, in the County of York, Engineer, and JOHN  
5 OGDEN, of the same Place, Engineer, do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN FURNACES OR FIRE-PLACES FOR THE PREVENTION OF SMOKE,**” to be as follows:—

Our Invention of improvements in furnaces or fire-places for the prevention of smoke relates to a novel or improved mode of constructing the dead  
10 plate of furnaces, so that air may be supplied to the burning fuel in a better manner than heretofore. Instead of a flat or plain dead plate placed on a level with the grate bars, as is now usually the case, we propose to bevel



Exley & Ogden's Impts. in Furnaces or Fire-places for the Prevention of Smoke.

or incline the back part of the dead plate, and place the grate bars on a level with the lower part of the dead plate. The inclined or bevilled part of the dead plate is perforated with holes to admit air to the fuel, and the upper or flat part of the dead plate is provided with an air valve, which opens inwards and towards the burning fuel. This air valve is capable of being opened and closed by rack and pinion, or other mechanical means which will admit of the supply of air being regulated according to circumstances.

**SPECIFICATION** in pursuance of the conditions of the Letters Patent, filed by the said Joseph Exley and John Ogden in the Great Seal Patent Office on the 24th December 1857.

10

**TO ALL TO WHOM THESE PRESENTS SHALL COME**, we, JOSEPH EXLEY, of Leeds, in the County of York, Engineer, and JOHN OGDEN, of the same Place, Engineer, send greeting.

**WHEREAS** Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Twenty-fourth day of June, in the year of our Lord One thousand eight hundred and fifty-seven, in the twenty-first year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said Joseph Exley and John Ogden, Her special license that we, the said Joseph Exley and John Ogden, our executors, administrators, and assigns, or such others as we, the said Joseph Exley and John Ogden, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "**IMPROVEMENTS IN FURNACES OR FIRE-PLACES FOR THE PREVENTION OF SMOKE**," upon the condition (amongst others) that we, the said Joseph Exley and John Ogden, by an instrument in writing under our hands and seals, or under the hand and seal of one of us, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

**NOW KNOW YE**, that we, the said Joseph Exley and John Ogden, do hereby declare the nature of our said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and

35



*Exley & Ogden's Impts. in Furnaces or Fire-places for the Prevention of Smoke.*

by the following statement, reference being had to the Drawings hereunto annexed, and to the letters and figures marked thereon (that is to say):—

Our Invention of “Improvements in Furnaces or Fire-places for the Prevention of Smoke” relates to a novel or improved mode of constructing the  
5 dead plate of furnaces, so that air may be supplied to the burning fuel in a better manner than heretofore. Instead of a flat or plain dead plate placed on a level with the grate bars, as is now usually the case, we propose to bevil or incline the back part of the dead plate, and place the grate bars on a level with the lower part of the dead plate. The inclined or bevilled part of the  
10 dead plate is perforated with holes to admit air to the fuel, and the upper or flat part of the dead plate is provided with an air valve, which opens inwards and towards the burning fuel. This air valve is capable of being opened and closed by rack and pinion, or other mechanical means which will admit of the supply of air being regulated according to circumstances,

15 Fig. 1 is a longitudinal vertical section of a furnace constructed and arranged according to our improvements; Fig. 2 is a horizontal section or plan view of the same; and Fig. 3 is an end or front elevation.

The Invention is shewn in the Drawings as being applied to an ordinary cylindrical boiler *a, a, a, a*, the furnace being placed within the same; *b, b*, are  
20 the fire bars; *c*, the fire bridge; *d*, the flue; *e*, the fire door; *f* and *f\**, the dead plate. The part *f\** of the dead plate nearest the fire bars is inclined and perforated with holes, as shewn in the Drawing, to admit air to the fuel on the fire bars. This part of the dead plate is of course a fixture. The higher or flat part of the dead plate *f* has a long opening made therein, and  
25 is provided with a valve *g*, which is mounted on centres, so that it may be opened and closed to any extent desired. The forward edge of this valve is provided with a quadrant-shaped plate *h*, perforated with a large number of holes, through which the air also enters the furnace from the ash-pit, as indicated by the arrows, and is distributed in thin streams among the com-  
30 bustible gases arising from the fuel. By the combustion of such gases the heat of the furnace is increased, and the evolution of smoke is prevented.

The valve *g* is opened and closed by means of the lever *i*, to which it is connected by the link *j*. The lever *i* is mounted in suitable bearings, fixed to the metal door frame or some other convenient part of the apparatus, and  
35 its outer end is connected to the vertical rod *k* of a self-closing regulator, which will govern the action of the valve *g*, and consequently the admission of air to the furnace. This regulator or governor may be placed in any other convenient position; for instance, it may be placed above the level of the fire



*Exley & Ogden's Impts. in Furnaces or Fire-places for the Prevention of Smoke.*

door instead of below it, as shewn in the Drawing, or if preferred it may be dispensed with altogether, and the valve *g* may be opened and closed by the fireman or attendant by means of an ordinary lever, such as the lever *i*, or by means of a sector rack and pinion, as will be well understood by any intelligent mechanic.

5

The construction and operation of the self-closing regulator or governor is as follows:—A cylindrical vessel *l* is filled half full of water, and another cylinder *m*, half an inch less in diameter than the outside, is placed within the cylinder *l*. The inner cylinder *m* is open at top, and is provided with a cross bar *n*, fixed near the top to connect it to the rod at the end of the lever *i*. At the bottom of the inner cylinder *m* is a flat valve, which admits the water when the lever *i* is thrust down. A small conical brass valve *o* is also placed at the bottom of the inner cylinder, and the extent of its exit opening is regulated by a screw at the upper end of the rod *p*, whereby it is kept open to let out the water at any given speed, thereby allowing the inner cylinder *m* to rise by the gravity of the valve *g* and its quadrant *h*. By this means the valve *g* and its quadrant is gradually shut down and closed, so as to prevent the air from passing through and mixing with the combustible gases.

15

Having now described our Invention of “Improvements in Furnaces or Fire-places for the Prevention of Smoke,” and having explained the manner of carrying the same into effect, we would observe, that although we have shown our improvements as applied to the furnace of a cylindrical boiler only, the Invention may be adapted to other furnaces, and as in such other applications of the Invention it may be found necessary to modify the arrangement and construction of some of the parts, we do not mean or intend to confine ourselves rigidly to the precise arrangement and construction of parts herein shewn and described, as they may doubtless be varied in some particulars without departing from the nature and object of our Invention. And we would further remark that we are aware that it has heretofore been proposed to admit air to the burning fuel from the ash-pit through an opening made in the dead plate. We do not therefore mean to claim such contrivance as any part of our Invention, except the object be effected substantially in the manner herein shewn and described; but that which we claim to be new in the above-described improvements, and therefore desire to claim as the Invention secured to us by Letters Patent, as aforesaid is,—

25

30

35

First, placing the dead plate above the level of the fire bars, and constructing a part thereof at an inclination to the other part and to the fire bars, and

---

*Exley & Ogden's Impts. in Furnaces or Fire-places for the Prevention of Smoke.*

---

perforating such inclined part for the admission of air from the ash-pit to the burning fuel.

Second, we claim adapting to the flat part of the dead plate the valve *g*, with its perforated distributing plate *h*, whereby air to support combustion is 5 supplied in thin streams from the ash-pit, and made to commingle with the gases given off from the fuel.

In witness whereof, we, the said Joseph Exley and John Ogden, have hereunto set our hands and seals, the Twenty-second day of December, in the year of our Lord One thousand eight hundred and fifty-seven.

10 JOSEPH EXLEY. (L.S.)  
JOHN OGDEN. (L.S.)

---

LONDON :

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
Printers to the Queen's most Excellent Majesty. 1857.







A.D. 1857. JUNE 24. N<sup>o</sup> 1770.  
EXLEY & OGDEN'S SPECIFICATION.

FIG. 2.

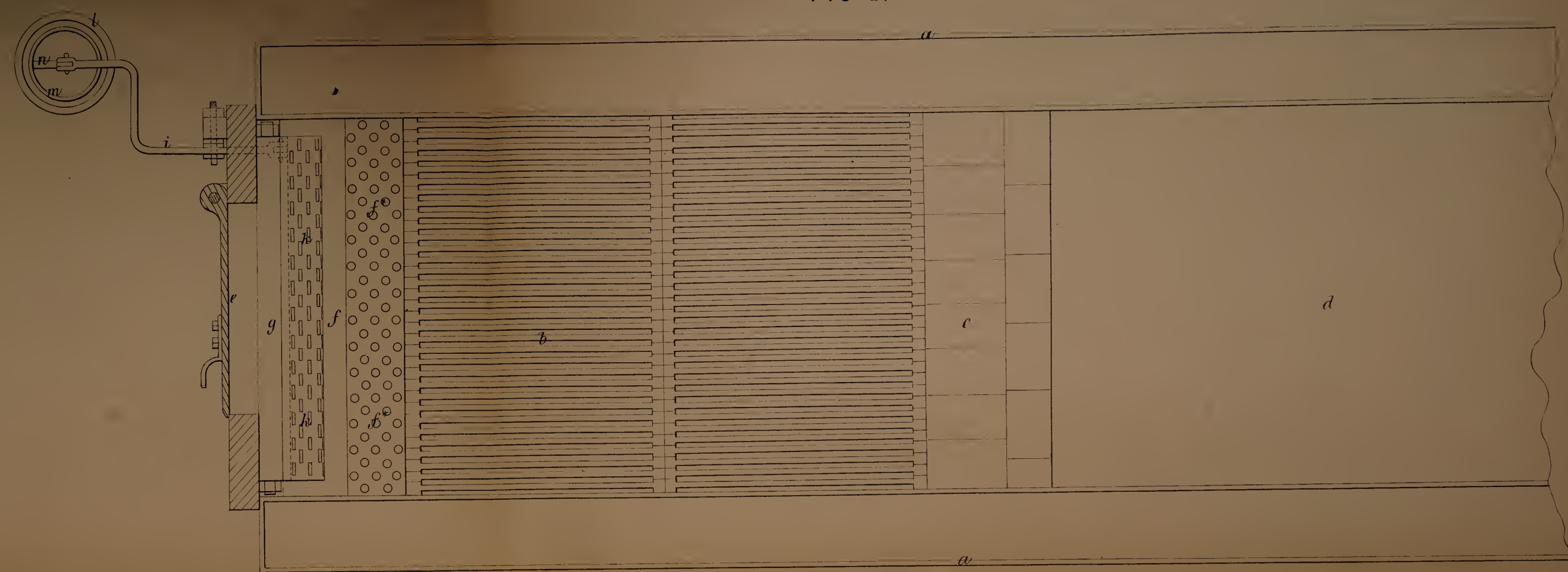
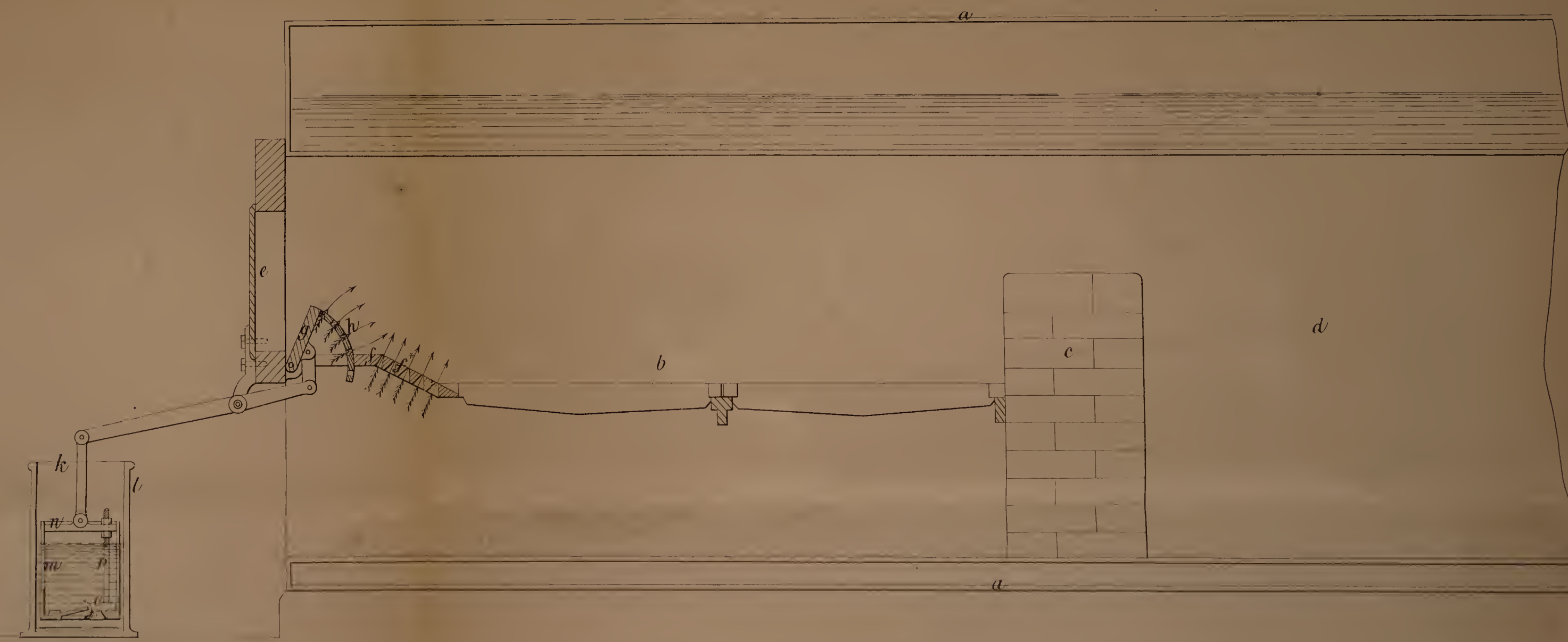
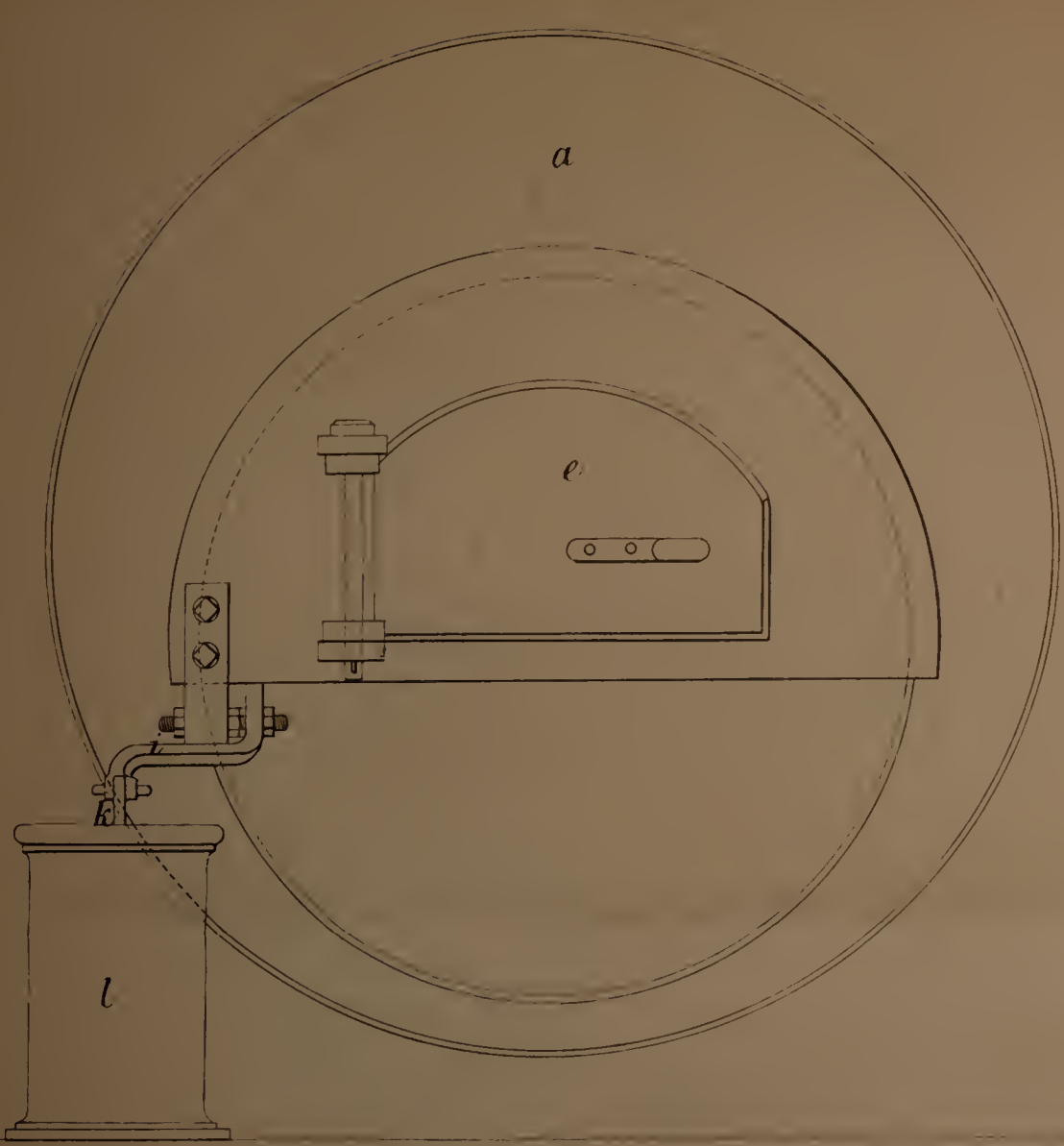


FIG. 3.



The filed drawing is partly colored

